

### **REMARKS**

This application was originally filed with Claims 1-25. In the Office Action, Claims 1-25 are rejected. As the result of the present amendments, Claims 1, 6, 11, and 16 have been cancelled and Claims 26-29 have been added; Claims 2-5, 7-10, 12-15, and 17-29 are now pending in the application.

### **REJECTION UNDER 35 U.S.C. § 112**

Claims 16-20 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite on the basis of the use of the term “a second inlet” in Claim 16. Claim 16 has been cancelled here and its limitations added to Claims 18 and 19, which have respectively been rendered independent; and in such amendment, the term “a second inlet” has been eliminated.

### **REJECTION UNDER 35 U.S.C. § 102**

Claims 1-3, 5, 16-18 and 20 are rejected under 35 U.S.C. § 102(b) as being anticipated by Voss et al. (U.S. Pat. No. 6,106,964).

It is respectfully submitted that Voss et al. does not qualified as a reference under § 102(b) because Voss was issued on August 22, 2000 and the present application was filed on May 3, 2001, which is less than one year from the issue date of Voss.

However, Voss will be dealt with under 35 U.S.C. § 102 for possible application thereunder under §§ 102(a) or 102(e).

It is said that Voss teaches all of the elements of Claims 1 and 16 as to valve placement, Claims 2 and 17 as to the type of valve, and Claims 3 and 18 with respect to

controlling of flow to one of two branches; and that the inlet line may be an anode or cathode line as in Claims 5 and 20. Without acquiescing to the rejection of independent Claims 1 and 16 and in order to facilitate issuance of allowable subject matter, Claims 2, 3, 17, and 18 are now in independent form and Claims 1 and 16 are cancelled. Claims 5 and 20 dependent on Claims 3 and 19, respectively.

It should be noted that Voss et al. clearly does not teach the features of Claims 2, 3, 17, and 18. Claims 2, 3, 17, and 18 are each directed to a valve that provides the capability to proportion the amount of flow of an inlet stream between two branches at the same time. One branch is the humidifier and the other branch is the bypass line.

Voss et al. nowhere teaches nor suggests a valve that is capable of controlling the proportion of flow simultaneously supplied to two braches as in the present invention.

Note that Voss et al., at Column 9, Lines 35-45, describes that valves 160 may be included so that the reactant stream can be supplied to the fuel cell stack without passing through the CHHE module 200. It is noted by Voss that this may be advantageous for purge prior to system shut-down when it is necessary to purge the stack with dry gas. It is also possible to periodically open the valve during operation to periodically permit all of the oxidant gas to flow through the stack and bypass the humidifier. For this purpose, Voss has arranged valves 160 and bypass path 150 so that flow is either provided to the stack, bypassing the humidifier, or through the humidifier and to the stack. Further, Voss states that a single valve permitting flow from an inlet to one branch or from an inlet to another branch may be used to accomplish this alternative branch selection.

Voss et al. is completely devoid of any teaching of proportioning simultaneously one portion of the inlet flow through the humidifier and to the stack and another portion through the bypass line to the stack.

It is respectfully submitted that the Office Action position that valves 160 are inherently restriction valves is unfounded. Voss et al. does not teach or suggest any proportion between two flow paths.

The specification of the present invention, at least at Paragraph [0026], clearly states that the valve 84 functions in cooperation with a humidity controller 90 so that humidity controller 90 varies the position of valve 84 based on a humidity signal. Valve 84 is a restriction or throttle valve, such as employed in internal combustion engines. It is clear that valve 84 varies the proportion of flow between the bypass line and the inlet to the stack.

Claim 2 has been amended to independent form by including the limitations of Claim 1 and Claim 3 has been rendered to independent form by including the limitations of Claim 1. Claims 2 and 3 now recite features nowhere found in Voss et al., and particularly the limitations as to “proportion” in Claim 3 and type of valve in Claim 2.

Claim 5 now depends on Claim 3.

Claims 17 and 18 have been amended in a manner similar to Claims 2 and 3, and are submitted to be patentable for the reasons given with respect to Claims 2 and 3.

#### **REJECTION UNDER 35 U.S.C. § 103**

A. Claims 6-8 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Voss et al.

Claim 6 has been cancelled, and the limitations of Claim 6 have been added to Claims 7 and 8 to render them independent respectively.

Claims 7 and 8 are directed to proportioning flow between two paths, the first path from the gas supplied through the humidifier to the stack and the second path through the bypass line to the stack.

The Office Action position is that it would have been obvious to re-arrange the position of the valves in the bypass line of Voss et al. to arrive at the invention of Claim 6, and that the features of Claims 7 and 8 are somehow further derivable from Voss.

For the reasons described with respect to the § 102 rejection on Voss et al., it is respectfully submitted that Voss nowhere teaches or suggests the proportioning of flow between two branches. Voss is not at all concerned with reducing the flow of gas through the humidifier as a way to achieve humidity control.

Voss et al. does not teach or suggest the utilization of a control downstream of the humidifier to achieve such result where a valve located between the gas supply and the inlet of the humidifier is operable to proportion flow between a first path to the humidifier and to the stack, and a second path through the bypass line to the stack.

Voss et al. nowhere suggests proportionality of flow nor a valve suitable for achieving such proportion. This is uniquely taught by Applicants in Paragraph [0028] where valve 100 is described as a directional valve that directs air between two different paths. Voss does not render the invention of Claims 7 and 8 obvious, since the system of Voss does not teach or suggest proportionality of flow between two paths and is not operable to achieve such proportionality, since Voss does not teach a directional valve nor a valve capable of controlling proportion of gas delivered to two paths.

Claim 10 has been amended to depend on Claim 9 and is no longer dependent on Claim 6; thus, the rejection no longer applies to Claim 10.

**B.** Claims 11-13 and 15 are also rejected under 35 U.S.C. § 103(a) as being unpatentable over Voss et al.

Claim 11 has been cancelled, and Claims 12 and 13 have been rendered to independent form by including the limitations of Claim 11.

In the configuration of amended Claims 12 and 13, a valve is located between the outlet of the humidifier and the inlet of the stack, and is a valve capable of controlling the proportion of flow to the stack and operates in a manner similar to the directional valve of Figure 4A as described in Paragraph [0028].

Paragraphs [0028] and [0029] describe in the configuration of Figure 4B, corresponding to Claims 12 and 13, that a proportion of flow from the bypass and from the humidifier is obtained for supply to the stack. Therefore, a proportion of gas that bypasses the humidifier and a proportion of gas that flows through the humidifier are mixed together at valve 100 in accordance with the desired humidity level.

There is no suggestion in Voss et al. of such a mixing arrangement. Voss simply does not show mixing flow from two branches. Voss only shows either: (a) supplying air to the humidifier and to the stack; or (b) supplying air through the bypass around the humidifier into the stack, as described at Column 9 and as made clear elsewhere throughout Voss and in accordance with the figures of Voss.

Claim 15 has been made dependent on Claim 14 and no longer is dependent on Claim 11, so the rejection of Claim 15 here is rendered moot.

**C.** Additionally, Claims 21-23 and 25 are rejected under 35 U.S.C. § 103(a)

as being unpatentable over Voss et al.

Claim 21 defines a configuration where the valve is between the humidifier and stack; and where the bypass line is connected between the valve and an inlet of the stack, and an opposite end of the bypass line is connected between the gas supply and the inlet of the humidifier.

It is the position in the Office Action that although Voss et al. is silent as to the valve being located out of the bypass line, it would have been obvious to do so.

It is respectfully submitted that the position of the valve being located completely out of the bypass line is so far removed from Voss et al. as to render the rejection on obviousness unsupportable.

Voss et al. relies on preventing flow into the humidifier. A valve downstream of the humidifier does not accomplish this result. Thus, there is no possibility to position the valve in such a location in Voss and prevent any flow into the humidifier as required by Voss. Further, the valve of the present invention, capable of proportion control, which is nowhere suggested in Voss, defeats the purpose of Voss. Voss is simply not operable to achieve proportional control and prevent flow to the humidifier.

It is evident that the only way that proportional control may be achieved, in the situation where the valve is located out of the bypass line, is in accordance with the present invention as defined in Claim 21 and having the type of valve recited in Claim 22 for proportional control, and having the type of valve recited in Claim 23 for proportional control.

Claim 25 is dependent now on Claim 24; and the rejection for its dependency on Claim 21 is moot.

D. Claims 4, 9, 14, 19 and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Voss et al. in view of Kanai et al. (U.S. Pub. 2001/0021468).

Kanai et al. and Voss et al. are not combinable because Kanai shows a fuel cell 1 supplied a reactant gas stream 11, which flows through a humidifier 2 and where a controller 21 controls the injection of water into the flow path of stream 11. That is, injector 17 controls the injection of water into the flow path 11. Thus, in situations where the humidifier 2 is relatively dry, injector 17 is used to inject water. In the system of Kanai, the controller, described for the first time in Paragraph [0228] opens and closes a valve that supplies water to injector 17. The controller of Kanai does not control a valve in a reactant line upstream of the humidifier, nor does Kanai control a valve in a bypass line. Therefore, the system of Kanai does not supply the deficiencies of Voss, nor is the system of Kanai combinable with the system of Voss. For these reasons, independent Claims 4, 9, 14, and 19 are not rendered obvious by Voss in view of Kanai; and Claims 26 (which depends on Claim 4), 10 (which depends on Claim 9), 15 (which depends on Claim 14), and 20 (which depends on Claim 19) are also submitted to be patentable.


#### **CONCLUSION**

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the

Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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